Ontario

Future Scenarios for Ontario

Resources Sector

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Abstract:

This report attempts to cover the very broad range of aspects repesented by the resources sector, which includes food, fibre and material production. The current situation in these areas is discussed with emphasis on economic restructuring as it is now occurring and how this process, together with major international political events, will shape the future. Future scenarios are given under low-and high-growth economic situations. The change in environmental problems is considered and federal/provincial issues discussed.

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FUTURE SCENARIOS FOR ONTARIO

-- Resources Sector --

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FOREWORD

As part of the Transportation Outlooks project, seven papers were commissioned, dealing with well-defined themes of major significance to the future development of Ontario. Under the main heading Future Scenarios for Ontario, the titles of the papers are as follows:

1/ The Environment
2/ Resources Sector
3/ Production
4/ Multinational Corporations
5/ Social Values and Behaviour
6/ Political Change
7/ Preliminary Assessment of New Technologies

The papers were commissioned from experts, several of them of national or international renown, in various fields. It is expected that their work, and additional material related to it, will be used in the development of a number of alternative scenarios of Ontario's prospects. The main objectives are to stimulate thinking about the future and to elicit feedback from MTC planners and other users of such information in order to guide further studies of the future, that are both relevant and timely.

It should be noted that these papers, which were completed in June 1982, are primarily the speculations or opinions of experts, not statements of fact. It should also be clear that a different choice of experts would have produced another set of opinions. Part of the process of anticipating future change is the painstaking analysis of detail, including quantitative information, and the expert assessment of emerging and disappearing trends and other qualitative information. Another part is the careful integration and synthesis of all these different types of information. Futures research requires the involvement and participation of all users to improve on the application of futures information to current decision-making.

Most of the reports delineate events as they would develop if Ontario, Canada, and the world were to follow two broadly different futures: low growth and high growth, as described in the following.

Low Growth

This future assumes an economic environment characterized by continued slow economic growth and attempts to reinforce the existing industrial structures globally and locally. The gap between North and South continues to widen, and there is little change in conditions in the Third World. Also, relations between East and West continue to be strained. At the same time, attempts to liberalize trade and capital movements as well as reform the international monetary system will be piecemeal and sporadic.

High Growth

The main features of this environment are more rapid economic growth and attempts to harness the new technologies (e.g., micro-electronics, biotechnology, oceanography, etc.) in building a new industrial structure globally and locally. The assumptions include greater co-operation between East and West, and North and South, with rapid improvements in the conditions of the Third World. At the same time, there will be strong and relatively successful attempts to liberalize trade and capital movements as well as reform the international monetary system.

Two of the reports are based on different pre-conditions. In the case of Preliminary Assessment of New Technologies, the two scenarios were simply omitted, and an assessment was done of the potential of developing a high-technology future for Ontario. The paper Political Change deals with two main scenarios and a third scenario which considers an overlay on each of the preceding two. One pre-condition -- in effect, an amalgamation of two alternatives -- was given for this paper and is as follows.

> Assume a competitive world environment (politically and economically) with slow rates of economic growth for most nations, a high priority for more economically successful countries to re-industrialize using high technology, and serious international competition for resources and markets. There will be winners and losers nationally, as well as by and within industrial sectors.

ABSTRACT

This report attempts to cover the very broad range of aspects represented by the resources sector, which includes food, fibre and material production. The current situation in these areas is discussed with emphasis on economic restructuring as it is now occurring and how this process, together with major international political events, will shape the future. Future scenarios are given under low- and high-growth economic situations. The change in environmental problems is considered and federal/provincial issues discussed.

TABLE OF CONTENTS

	PAGE
FOREWORD TO THE SERIES	ii
ABSTRACT	iv
1/ INTRODUCTION	1
2/ CURRENT SITUATION	2
2.1/ The Economic Context	2
2.2/ International Political Aspects	6
3/ FUTURE SITUATION	11
3.1/ Mining, Smelting and Further Processing of Metal	11
3.1.1/ Introduction	11
3.1.2/ Nickel	11
3.1.3/ Copper	14
3.2/ Forestry	17
3.3/ Agriculture	22
3.4/ Fisheries	25
4/ FUTURE SCENARIOS	27
4.1/ Low-Growth Scenario	28
4.2/ High-Growth Scenario	29
5/ ENVIRONMENTAL INTERFACE	31
6/ FEDERAL/PROVINCIAL RELATIONS	33
7/ CONCLUSIONS	35
8/ REFERENCES	37

1/ INTRODUCTION

This report has been prepared as a basis for future profile development and strategic planning. Of necessity, it is painted with broad strokes and is highly speculative. It attempts to cover the very broad range of aspects represented by the resources sector, which includes food, fibre and material production. Therefore, it cannot be precise.

The paper emphasizes the importance of economic restructuring as it is now occurring (mid 1982) and how this process, together with major political events, will shape the future. More than at any time since World War II, econometric projections of the future should be suspect. Economies have developed segmented responses, economic maturation is occurring, revolutions and political re-alliances come and go with new rapidity, and the world's resource base has been newly questioned from a standpoint of economics as well as environmental well-being. It is this newness that must form the basis for informed speculation. Indeed, many aspects of the current situation discussed in this report are already out of date.

2/ CURRENT SITUATION

2.1/ The Economic Context

The resources sector, particularly metals and pulp and paper, is capital-intensive, requiring ever-increasing financial resources to maintain its position in a world marketplace beset by widespread recession and inflation ("oil shock") induced by the Organization of Petroleum Exporting Countries (OPEC). Firms, industrial sectors and the economy as a whole are undergoing fundamental restructuring. The OPEC-induced oil shocks have dramatically influenced both marginal and capital costs, which, in turn, have influenced the competitive position of energy-sensitive industry. The recent recession demonstrated these effects through a segmentation of the Western economy, particularly in the United States, where electronics, aerospace and energy remain relatively healthy, and traditional non-adaptable consumer-oriented industry, such as autos, is in a depression. Rather than the squeeze coming across the board in all sectors and, as a consequence, the weaker firms being pressured, entire sectors of the U.S. economy are threatened. They are threatened for several reasons, foremost of which is the dramatic shift of cash flow in the economy: over the period 1975 to 1980, some 85% of the increase in corporate profits was generated by 56 oil companies. The second reason is the high cost of money: few, if any, industry sectors can generate an adequate return on investment with interest rates at current levels. The third reason is related to the others: the cost of new plants and equipment now reflects increased energy and labour costs, but the price of the product produced is not high enough to generate a return adequate to justify the investment.

It is this economic environment which dominates industrial planners as they make investment decisions for the remainder of the century. The long-term nature of these decisions makes it possible to predict at least some of the industrial structure which will exist at the end of the century. A decision taken today to go ahead on a new smelter means a 2-year planning and design cycle, a 3-year construction period and a minimum of 20 years operation over which the capital costs are annualized. It is questionable whether boards of directors are in a position to make any positive investment decisions, given the unsettled economic environment.

The Western economy is facing a fundamental and exceedingly difficult result of the OPEC-induced inflation of the '70s, which is one of the reasons that industry has not retooled but instead indulged in an orgy of take-overs. The price of oil and, therefore, energy rose dramatically through the decade, but because of inflation, in real terms it did little more than remain constant. It did, however, affect everything else. Inflation forced its way through the economy and came to be severely reflected in the cost of new plants and equipment. For example, the cost of one metric tonne (t) of new copper smelting and refining capacity rose from $3000 in 1970 to $9000 in 1980. At the same time, the price of copper declined severely, in real terms, such that the price did not justify investment in new plants. The money which is currently being invested in the copper industry in the United States comes from companies which have been taken over by oil interests with enormous cash flows. Their investment decisions are predicated on the assumption that metal prices will rise dramatically to justify the investment, and they are prepared to wait until such a rise occurs. Other non-energy companies are not in such a privileged position, and unfortunately, there is only so much oil money available for speculative investment. The threat of considerable economic concentration also becomes very real.

The inactivity created by high capital costs, high money costs and low product prices has severely affected almost all of the primary sectors of the U.S. economy, particularly iron and steel, other metals, agriculture and chemicals. Unfortunately, if the price of these primary products does rise sufficiently to justify reinvestment, the price rises will set off their own waves of inflation with an impact similar to that caused by OPEC. Until this re-equilibration of other primary-product prices with energy prices occurs, the United States economy and the Western economy as a whole will be out of joint and investment decisions in the resources sector will reflect these circumstances.

It has been suggested that the energy crisis is over in the United States, that consumption is declining, domestic drilling is sky-rocketing, imports are down, and OPEC is starting to fall apart. All of these things may be true, but they do not indicate an economic recovery. Mostly, they indicate that the United States is in an economic recession. For example, it costs more than $3.50 to produce 1 lb. of nickel in much of the world,

when it now sells for $2.22 and the producer needs $6.00 to make an adequate profit, and the U.S. grain producer who receives $4.00 for a bushel of wheat needs $5.60 to break even. As a result of these squeezes, many industrial sectors have no money to invest. Tax savings assume the payment of taxes on profits in the first place. In many cases, there are no profits to tax or not to tax.

When the energy sector had capital available, particularly the multi-national oil companies, they invested in some vertical integration and the metals industry. Vertical integration has taken place largely through investment in petrochemicals, which are now in an over-capacity situation. Ethylene plants are closing in the U.S. because of high operating costs and lack of markets. At the same time, new plants are springing up in Alberta because of lower Canadian costs. Metal company take-overs have inc'uded British Petroleum's purchase of Selection Trust, Penzoil's purchase of Kennecott Copper, Atlantic Richfield Corporation's (ARCO's) purchase of Anaconda, Hudson Bay Oil and Gas' (Dome's) purchase of Cypress Anvil, Socal's attempted purchase of Amax, and Standard Oil of Indiana's purchase of Cypress Mines, largely in the United States.

One must assume that these companies feel that metals, in particular copper, will experience the next great rise in price and that other parts of the world are politically insecure. Also, the metal company assets were undervalued. These decisions were taken, however, before the current slide in oil prices and the apparent disunity in OPEC. Oil companies which initiated projects based on inflated cashflows and oil price projected at $90 per barrel by the end of the decade have had to rethink their whole position. Oil prices could drop as low as $20, and OPEC could shatter. The resulting political upheaval in the Middle East could send oil prices sky-rocketing again. So long as energy prices, which are a major component of all industrial costs, remain on a roller-coaster, few industrial decisions will be made.

Investment patterns world-wide will shape industrial development well into Ontario's future. It is worth examining the trends in Japan, the world's most efficient economy, as a means of further ascertaining future behaviour. The official Japanese outlook is still comparably bright, with 5% growth last year and projected slow recovery at present. This

description, however, obscures a fundamental schism that is emerging as an after-effect of OPEC. Japan has a booming processing and fabricating sector made up of electronics, motors and high-tech. It has a depressed materials sector, including oil refining, pulp and paper and non-ferrous metals. Processing output has risen 16% in the last year, while the materials sector is down 10%. The difference is largely due to a cut in energy consumption and a boost in productivity by the processing sector in response to the oil shocks of 1973 and 1979.

The materials sector is depressed because it is irretrievably tied to the price of energy. Aluminum is perhaps the best example where almost all smelting plants run on electricity provided by oil-burning power stations. It costs Japan approximately Y500 000 to smelt 1 t of aluminum, and the current market is running at Y350 000/t to Y400 000/t. Many of the other industries are in a similar position, thus, creating a marked division between world beaters and non-starters.

The Japanese, in their official policy, now recognize that no new, heavy-industry plants will be constructed in Japan. Their emphasis for on-shore development will be the "knowledge-intensive" high-tech industries, which allow them to most effectively apply the advantage generated by a highly-efficient, motivated workforce and industry/government co-operation.

This analysis has been cursory, at best, but it does illuminate a partial pattern. Investment in base metals probably reflected industry optimism about future price rises in all primary resource materials. Most important, though, is the deliberate decline of heavy industry in Japan and the rapidly accelerated development in low-energy, high-tech areas. Countries like Canada, with an abundance of resources, including energy, may find themselves winners by default in resource areas, but not until well into the future.

The industries to be treated in this report are capital-intensive and will not experience the dramatic changes of the high-technology sectors. The forest and mining industries will try to remain competitive through constraining of marginal costs, including the cost of capital, energy and labour. Agriculture will begin to catch up after having lagged for many years.

2.2/ International Political Aspects

There is a tendency for economists and strategic planners to rely on economic factors as the basis for their projections. There is something professionally natural but, nevertheless, blind about such activity. The free market does not exist for the major items which are discussed in this paper. Bilateral agreements have replaced free trade. International cartels are replacing corporate oligopolies, and of greatest importance, politics and revolution march on in the resource-rich Third World, which is Canada's competitor as a resource producer.

Central Africa provides one of the most useful examples of resource wealth, political instability and strategic importance. Twenty-two percent of the Western world's copper is produced in Africa, of which 80% is produced in troubled Central Africa. Ninety percent of Zambia's exports are represented by copper. Forty-three percent of Zaire's exports are copper, and 21%, cobalt. Sixty percent of the Eastern world's cobalt comes from Zaire. The two metals are, of course, tied together from a production standpoint, since the ore contains both metals.

Both Zambia and Zaire are dependent upon a railway route through Zambia and Zimbabwe to Port Elizabeth in South Africa. This line carries more than half of the copper produced. Of equal or greater importance is the backhaul of spare parts, diesel fuel and food for the miners. If this rail link is broken, the economies of both countries would be devastated.

There is some suggestion that relations between South Africa and Zimbabwe will deteriorate to the point where South Africa will close the border. This is not very likely, since it is not in the interest of the Botha regime to destabilize Central Africa. Of greater concern is the recent ouster of Nkomo by Prime Minister Mugabe in Zimbabwe. Nkomo leads the Matabele (warrior tribe), a heavily-armed minority centred in Boulawayo in south-western Zimbabwe. Armed conflict between the Matabele and the Shona, Mugabe's tribe, will almost certainly break the rail link, with immediate drastic effects in Zambia and Zaire, and equally drastic effects on the world copper and cobalt markets.

These economic effects might be mitigated, to some extent, by international assistance to the governments of those countries, and the rapid reopening of the rail link. The fragility of the Mobutu and Nkomo regimes, however, leaves little hope for continuity in the face of economic crisis. Mobutu's greatest threat will come from the army, which is already unruly because of poor training, irregular pay, shortage of supplies and profound isolation in the large, untracked territory of Zaire. Loss of foreign exchange would precipitate an immediate crisis through lack of government funds, import shortages and major inflation.

The current low prices of copper and cobalt have precipitated a fiscal crisis of their own recently, without the assistance of external transportation upheaval. Recently, the International Monetary Fund (IMF) rescued Zaire with a loan ($1.03 billion U.S.) on which Zaire has already defaulted repayment. The country is unable to use IMF Special Drawing Rights. The fiscal crisis is largely due to a decline in export receipts from an expected $1.9 billion to $1.5 billion.

Zaire's stability is politically important to France and the Reagan administration. At the directio of President Giscard D'Estaing, French paratroopers stabilized the copper-rich province of Shaba during a rebellion in 1978. France has always pursued an independent foreign policy in Africa, openly serving her own purposes. France needs a stable source of raw material, as does the rest of Europe. There is likely to be substantial involvement on their part again, both to protect French mining interests, and to prevent an increase of Soviet hegemony.

Zambia, meanwhile, shows many signs of political difficulty. Recently, two U.S. diplomats were expelled from Lusaka, and the trade union leaders from the Copper Belt were arrested. Prominent figures were charged with treason, the planning minister was dismissed, and scandals pervaded the Kaunda administration. The railway system is in disarray, expatriate personnel are leaving in droves, fuel costs and spare-parts costs have escalated enormously in the mining sector, agricultural production has declined severely over the long term, and the country has a severe shortage of development capital.

These factors represent some of the difficulties faced by the Third World countries. They are relevant to the year 2000 because major projects and major economic sectors develop slowly. If the mines in Zambia closed down, it would be many years before they reopened. These countries do not have a socio-technical structure which maintains itself and which is able to grasp economic opportunity when it presents itself. If these economies are allowed to fail, it will be the Soviets or Western industrial nations which reopen the mines, if ever.

The rapidly-industrializing nations, such as Brazil, Mexico and parts of Asia, have other unique characteristics which will influence their position. Brazil is seen as a major force in both mining and forestry by some. It must be remembered that Brazil is industrializing against enormous odds.

They have been in the unenviable position of having galloping inflation before the advent of OPEC, of seeing it increase dramatically because of oil imports, and of watching the economy falter under the demands of an increasing population and a severe imbalance of trade.

The population is estimated at 123 million, more than double that of 20 years ago, and at current rates of growth, it will double again in 20 years. Seventy percent of the people are crammed into six cities within 160 km of the coast. Urban strife, crime, disease, poverty and starvation are the order of the day. The country must create 1.5 million new jobs each year simply to stay even, let alone accommodate the massive proportion which is now unemployed. It must generate 6% real growth to do so.

Brazil imports 229×10^9 barrels of oil annually. This figure must increase to support any growth, let alone the 6% which is required. At the same time, their financial position is precarious due to massive borrowing in the past. The country must develop its resources. It must also decentralize. It has no other choice, and neither do its creditors.

Brazil has a major dilemma in that infrastructure must be developed to support mineral and forestry development under inhospitable wilderness conditions and at a high cost. Such development will not come overnight.

The real question is whether Brazil can win the race to develop before financial ruin and political unrest destroy the process. A doubling of population over the period required to see substantial metals and forestry development is an almost insurmountable problem.

These difficulties in the Third World are important aspects of the world balance of power and the status of hegemony on the part of the superpowers. The United States currently finds itself in a difficult minerals resource position. Unlike Canada, which has offshore dependency only on bauxite, tin, manganese and phosphates, the Americans import a host of products in finished and unfinished form. Their domestic production of zinc, lead and copper is in dramatic decline. Over 60% of their zinc industry has shut down in the last decade, and they are likely to lose close to 40% of their copper mining and smelting capacity. This decline, together with a more general military and industrial degeneration, is cause for some alarm.

The Soviet Union is pursuing, at the same time, what appears to be a significant policy of external resource utilization. The U.S. is afraid of Soviet penetration into areas such as Central Africa, most notably Zaire, since such penetration would give them control of 60% of the world's cobalt. Cobalt imports (as well as manganese) are essential to weapons manufacture.

At the same time, the United States is the world's food machine. It will always dominate all areas of international food markets and, hence, the Ontario position. It is quite conceivable that food will become a part of the bargaining process by the year 2000.

There is considerable disparity among the Third World nations as to their ability to utilize their own food production potential. Parts of central and southern Africa are among the richest agricultural areas in the world. Under British rule, Zambia (Northern Rhodesia) was a major food exporter. Now parts of Zambia are starving. Zimbabwe has been a major agricultural producer, but there is some worry about the future of the large integrated farms.

In spite of agricultural potential, many countries do not have the technical and social traditions and structures required to support large-scale, intensive agriculture. At a time when world food demands are increasing dramatically, actual production in some areas of large potential will be in decline.

The international context for the year 2000 will be one of supply instability and shortage. Food, fibre and materials will be at a premium. Politics and the use of materials will become much more closely tied. The decline of both U.S. and Soviet hegemony will precipitate supply crises in the resource-rich Third World, which will enhance the position of resource-rich, stable nations like Canada. Whether Canada will be able to make independent political decisions under these new conditions is open to conjecture.

3/ FUTURE SITUATION

3.1/ Mining, Smelting and Further Processing of Metal

3.1.1/ Introduction

Ontario is a significant producer of nickel, copper, zinc, gold, platinum group metals (PGMs) and silver. With the exception of the gold producers at Red Lake, most of these metals are tied together in their production. The International Nickel Company (INCO) produces an amount of copper equal to nickel, as well as large amounts of gold, silver and PGMs, but all of these are considered nickel by-products. Similarly, Kidd Creek Mines produces both copper and zinc with a significant silver by-product. It would be correct to assume that much of Ontario's metal production future is tied to world markets for nickel and copper. The province has among the most efficient steel industries in the world, much of it based on the import of iron ore. At present, steel is more of a processing industry than a resource industry, but that could change with the discovery of new iron deposits, or the utilization of existing lower-grade material or material from remote areas such as Quebec.

It is important to recognize that nickel and copper are exported into a world market where prices are determined by a host of factors, including the previously-described political aspects. Further performance, as in the past, will depend on the competitiveness of marginal cost relative to other producers and relatively secure sources of supply.

3.1.2/ Nickel

Ontario represents 30% of world production capacity for nickel. INCO Limited, through its INCO Metals Division in Sudbury, accounts for 22%, and Falconbridge Nickel Mines, the remainder.

If one allows for past abnormalities affecting nickel consumption, such as nickel shortages, wars and major strikes, then in broad terms, nickel consumption correlates reasonably well with the direction and momentum of world industrial production activities. The Organization for Economic

Co-operation and Development (OECD) Industrial Production Index* has, in the past, shown a very close correlation with nickel consumption.

Nickel consumption since World War II has been dependent upon the total level of industrial production and the level of capital expenditures which generated new plants and equipment. About 70% of the nickel consumed in the Western economy was due to this type of capital investment.

Growth in nickel consumption is expected to fall relative to past performance for several reasons.

- All major nickel consumption areas, including Western Europe, Japan and the U.S., have completed their rapid economic expansion phase and will have more mature low-growth trends.

- Countries in the economic take-off phase, such as Mexico, Brazil and South Korea, are still in early stages of establishing mass production consumer economies and may take many years before they have high-growth rates of industrial expansion.

- High energy costs are resulting in a drain, from developing nations, of foreign exchange which would otherwise have been used for industrial development.

- The Western economy is not replacing facilities because of the high cost of capital.

These factors generally apply to all non-ferrous metals, in reducing the proportion of Gross National Product (GNP) growth occupied by metals in the Western economy.

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* The OECD Industrial Production Index measures the level of combined industrial activities of 24 industrialized countries. The members of OECD are Australia, Austria, Belgium, Canada, Denmark, Finland, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the U.S.

The longer-term future for nickel, up to and including the year 2000, must be, at least officially, optimistic. During the last decade, capital expenditure in the industrialized countries has been very low. In part, it is a reflection of the mature economic structure previously discussed, but mostly, it is due to economic hardship and the lack of investor confidence. Large new projects requiring substantial amounts of stainless steel, such as petrochemical facilities in the United States, have been shelved. This investor reluctance has resulted in a decline in productivity and increased unemployment levels. At some point, the governments of the Western nations will need to induce capital spending, or face a major permanent decline in productivity and living standards. When this occurs, those nickel producers which are in place will experience major boom conditions until the end of the century.

The competitive position of the Ontario-based operations is determined, to a large extent, by their marginal-cost position. Energy costs in Sudbury are about one-sixth of energy costs among laterite nickel producers in the tropics. This lower energy cost is due to the energy value of the sulphide ores found in Canada and, to a lesser extent, elsewhere. The oxide or laterite ores found in New Caledonia, the Philippines and Cuba are all currently extracted with oil-derived energy. These producers are now, in some instances, shifting to coal, but no matter what energy system efficiencies are implemented, the stoichiometric requirements of extracting nickel from oxide ores will always make these high-cost operations.

Canadian labour costs are currently higher than those in many of the developing countries, but towards the end of the century, it is very likely that labour rates will be much more equitable.

It is, therefore, safe to assume that from a marginal-cost standpoint, Canada will remain more than competitive. INCO will shortly announce construction of a new smelter in Sudbury. This new project is a result of experiments carried out in Thompson, Manitoba, and a direct consequence of government pressure to reduce sulphur dioxide emissions which contribute to acid rain. These capital costs will be high because of the economic phenomena of the '70s discussed in Section 2.1. However, it should be emphasized that the advantages of low marginal costs described above,

together with the improved efficiencies of the new smelter, are so great as to substantially overcome the detrimental effects of high capital cost.

It would be reasonable to suggest that Ontario capacity for nickel production in the year 2000 will be 225 000 t. It would also be reasonable to suggest that the province will remain the lowest-cost producer in the world. However, there is not a free market in nickel. Whether these circumstances will change is dependent upon political will and the long-term ability of governments to carry unprofitable producers.

At the present time, 60% of world nickel capacity is in a severe negative cashflow position. Some of these producers, such as Societe Metallurgique Le Nickel (SLN), the Greenvale Project in Australia and Marinduque in the Philippines, have substantial government participation or support. Without such support, there would be few, if any, of the laterite producers still in operation. (INCO has shut down its Guatemala operation and Falconbridge Nickel Mines Ltd. has closed Dominicana. Both are laterite operations.)

These producers require a nickel price in excess of $4.00/lb. to make an adequate profit. Unless the recession turns dramatically, that price is not likely to be realized. The future of all laterite deposits depends on the price of energy relative to the price of nickel. There are other substantial unknowns. Cuba has the world's largest nickel ore reserves -- all laterites. If the Soviet Union decided to provide sufficient oil, Cuba could become the world's largest source of nickel. This decision will be made based on need for hard currency and political advantage, not on a cost-competitive basis.

3.1.3/ Copper

Ontario provides 30% of Canada's copper, most of it in the refined form, from the Sudbury nickel smelters, as a by-product, and from the Kidd Creek Mines Limited operation at Timmins, where it is produced with zinc. The remainder is produced as copper concentrate and shipped to Quebec for smelting and refining.

The world copper market is very complex -- it includes dozens of producing companies scattered throughout the world. No group or nation controls the market.

Copper consumption patterns following World War II were based on phenomena similar to, but different from, those which influenced nickel.

- The large U.S. industry was shifted into civilian production, and the consumer economy in the U.S. was catching up with civilian demand after years of war shortages.

- There was massive reconstruction of the war-devastated Japanese and European economies, and a change toward the American type of consumer society.

- Copper consumption in Europe and, particularly, Japan rose rapidly with the rise of living standards, electrification, increased housing and car production, technical innovation, and growth in electronics and mass media.

In broad terms, post World War II copper consumption increased parallel to the growth of the GNP and industrial production in the three major advanced industrial areas: the U.S., Europe and Japan.

In 1975, the world economy was hit with a major recession and an energy crisis. In the same year, the OECD Industrial Production Index showed nearly a 10% decline as a result of these developments. Five years later, in 1980, the Index had not yet recovered to the past trend line. During this period, world economies were shattered by 10-fold increases in energy costs, rampant inflation and rapidly-increasing social demands and costs, all of which have resulted in a major world-wide slowdown of true capital formation and reinvestment in plants and equipment.

In 1973, copper consumption in the U.S., Japan and western Europe was about 6×10^6 t, which is about the same level as the estimated consumption in 1980.

In addition to the slowdown of economic growth in advanced countries in recent years, growth of copper demand has been reduced due to other factors.

- Competing materials (plastics, aluminum, etc.) have intruded into traditional copper uses like tubing, electrical transmission cables, car radiators, heaters and air conditioners. In the last 20 years, copper use in cars has declined 50%, whereas aluminum has increased three times and plastics four to five times.

- Technological advances, miniaturization and improved production methods have increased efficiencies in the use of copper, resulting in reduced copper uses due to thinner wall plumbing pipe, thinner wire and smaller circuits for electrical and electronic applications.

- The rapid increase in copper use in all advanced countries, due to electrification, developments of communication networks and a broad mass-production industrial base, has now reached a plateau and is expected to increase at a much slower rate from here on.

- Countries that are currently in the "economic take-off" phase, such as Brazil, Mexico, South Korea, Taiwan, North Korea, the Middle East, Singapore, Indonesia, etc., are still at relatively early stages of establishing mass-production consumer economies, and while the growth rates of copper consumption are high, the actual quantities involved in terms of world consumption are relatively small.

- The U.S.S.R and Eastern European countries could experience a rapid growth in copper consumption in the 1980s, but it is doubtful if the communist governments will allow the development of a mass-production consumer economy to the level where it could become dependent on raw material supplies from non-communist sources.

At present, INCO sells most of its copper in Europe, and Kidd Creek splits its sales between the U.S. and Europe. The traditional end-users of copper are building and construction (30%), electrical products (28%), industrial machinery and equipment (18%), consumer products (13%) and transportation. The most exciting copper substitution activity is in fibre optic

replacement of copper transmission cables. However, this substitution is expected to account for 150 000 t to 250 000 t by 1990 and, perhaps, 400 000 t by the year 2000. This represents 2% of Western copper consumption. Meanwhile, there will be substantial growth in new uses, including marine and solar-energy applications. There will be other downside factors, such as the use of zinc in coins.

The INCO flash furnace employed at Sudbury, the electric furnaces at Falconbridge and the Mitsubishi process at Kidd Creek are considered to be state-of-the-art technology. There is unlikely to be any technological breakthrough which will render these operations uncompetitive before the year 2000.

Canadian mining and smelting operations are among the lowest cost in the world. If the copper market is upset (which is unlikely) by substantial substitution, the industry will be among the last to suffer, unless there is political intervention. Some disadvantages in transportation costs occur because markets are offshore but, even with this disadvantage, it is likely that Ontario producers would maintain their share in a shrinking market.

3.2/ Forestry

Ontario is dominated by mills which produce newsprint and market kraft pulp, in about equal volume. At present, markets are affected by tariffs, transportation costs and energy costs. From an efficiency standpoint, it is best to process paper at the mill site, since the costs of pulp drying, baling and re-pulping are then avoided. However, there are tariffs on fine papers entering the U.S. and European markets. There is no tariff on newsprint. Any move to increase efficiency (in the absence of tariffs) would be to produce and export paper.

Ontario mills are supplied with softwoods (primarily black spruce and pine), wood chips from sawmill operations, and recycled paper. They also treat small amounts of hardwood, primarily aspen. Softwood pulp contains long fibres which make a higher-quality paper product. This gives Canadian pulp an advantage over tropical pulps, which are generally hardwoods.

The Ontario Ministry of Natural Resources is currently conducting genetic research and productivity analyses on hybrid poplars. The newer chemical mechanical pulping (CMP) techniques also make the use of poplar, including aspen, much more attractive than in the past. Although pulping of aspen is likely to develop more quickly in the prairie provinces, there is some possibility that new mills will treat 50% hybrid poplar and/or aspen. Poplar is unlikely to replace spruce and pine in economic significance, however, since the long fibres will remain the necessary constituent of fine papers.

Wood fibre from tropical sources is often seen by forecasters as a threat to the Canadian industry. It is true that a great deal of activity has taken place in South America during the last decade. Brazil had, until recently, the Ludwig-financed Jari project in the Amazon, which produced pulp from plantations of eucalypts and gmelina. That project recently closed, and Ludwig withdrew, leaving it in Brazilian hands. It was originally felt that these plantation sources would be cheaper because of more positive climatic conditions, lower labour costs and more available access to markets. Ludwig's failure has highlighted the difficulties of operating in the Amazon Basin, where very substantial problems have emerged to offset the originally-described advantages. Infrastructure is non-existent and costly to develop. The soils are very nutrient-poor, with all available nutrient recycled quickly into the standing-crop biomass of native vegetation. The harvesting of plantation species increases leaching and furthers the development of lateritic hardpans, which will inhibit future growth. Equipment maintenance and material supply have proven difficult and costly.

These factors are not as critical with pine and eucalypt plantations elsewhere in Brazil, but it must be recognized that many other factors influence Brazil's ability to become a large and influenced presence in the international market: inflation was almost 100% in 1981, and the country is completely dependent upon oil imports other than its small domestic production and gasohol production.

Perhaps anticipating these types of problems, Borj Steenburg, formerly Assistant Director of the Food and Agriculture Organization (FAO), stated, in 1976, that fibre from these fast-growing plantations will not be cheap, and there will have to be a return to the northern coniferous belt as the

The Ontario industry is facing several major problems which loom much larger than offshore competition. Provided that the trees are physically available, timber harvests in Canada are expected to increase by 45% by the year 2000, and their cost will more than quadruple. During the period 1950 to 1975, logging productivity improved at an annual coverage rate of 5%. This was sufficient to offset increased wages, investment costs, poorer wood quality, and increased forest management and environmental costs. However, transportation costs of this harvested wood increased dramatically, in part because of energy costs, but largely because of increased haulage distance, such that delivered wood is now becoming more and more expensive. All pulp and paper mills in Ontario have increased their haulage distances by as much as 322 km. Logging productivity increases in the future will not be sufficient to compensate for other increased wood costs.

In addition to high transportation costs, the following factors will almost certainly change the economics so that it will be more practical to intensify silviculture near established mills.

- Trees are smaller and less dense in the areas now being opened.
- Growth rates are less.
- Labour is increasingly reluctant to work in remote camps.

The management mode will probably resemble existing practice in Scandinavia.

Increased cost will demand increased price for the product. The ability to secure such a price will be influenced by the anticipated reduced growth in principal forest-product consuming industries due to the oil shocks and general recession. In addition, substitution is now increasing as technological improvements are made and will increase even further if forest-product prices inflate above the general inflation rate, which they have done in the immediate past. (Newsprint prices increased 12% per year between 1971 and 1976.)

Newsprint production in Canada is expected to be 55% more in 2000 than in 1979, based on a 2% growth rate, or somewhat diminished from previous levels. A reduced growth rate is predicted because:

- newspaper publishing is expected to be slower;
- television and other media are expected to increase their market share;
- price increases are expected to force publishers to limit newsprint consumption per printed page;
- traditional Canadian markets in the U.S. are predicted to be subject to demographic shifts from the North-West to the South-West which will be served by U.S. producers; and
- government protectionist intervention is anticipated.

Reduced growth rates and increased production and capital cost will force industry to take the following actions:

- reduce wood transportation cost by substitution of other materials for delivered roundwood, and improve wood processing to increase effective forest yields, i.e., by utilizing wood processing residues; and
- increase wood processing efficiency by decreasing labour and energy costs.

The pulp and paper industry embarked on an energy-reduction path in 1979, with the goal of reducing consumption by 30% from the 1972 totals. From a national standpoint, this is significant, since this industry accounted for 18% of industrial energy consumption in 1978. They are likely to achieve their goal through a programme which involves:

- the use of less energy by modification of processes so that they require less initial energy, e.g., heat recycle; and
- fuel substitution through use of wood wastes and pulping liquor.

It is expected that Ontario pulp mills will move to the use of heat peat, as is already done in Finland and Russia.

Most pulp mills in Ontario are currently undergoing extensive modernization that incorporates energy conservation and pollution control as well as new production efficiencies. Mills now include modern technology, such as the Rapson-Reeve complete recycle process at Great Lakes Pulp and Paper and the new thermo-mechanical pulping process at Kapuskasing and Dryden.

The competitive position of the industry must still be focussed and interpreted in terms of United States producers generally (see Table 1.)

Table 1/ Estimated Costs for Production of Paper-Grade Market Pulp in 1980 (U.S. $/t)

	Softwood			Hardwood
	Canada	Sweden	U.S. South	Brazil
Fibre	99	200	96	40 - 50
Labour	48	90	47	30
Energy		80		22
Chemicals	29		36	25
Other	83[1]	100	88[1]	183
TOTAL	259	470	267	300 - 350

[1]Includes energy.

Since much of the Canadian supply must compete with U.S. domestic producers in their market, behind U.S. tariff barriers on paper, it is

obvious that the future depends on the U.S. producer capacity and market. At present, the exchange rate provides sufficient balance to offset the U.S. cost advantage and give Canadian producers a place in the U.S. market.

The pulp and paper market is product-segmented. For example, the fast-growing, light-weight, copier paper sector requires the premium quality fibre of the slow-growing Canadian trees. Although it is likely that South American and other short-fibre pulps will increase as a relative proportion of supply, the northern bleached softwoods from Ontario will occupy a strengthening position as a supply of premium fibre. Ontario hardwood pulp will increase its proportion of total world production.

Potential alternative fibre sources include bagasse (sugar cane residues), kenaf and energy crops such as hydrocarbon-producing species. It is doubtful that biomass energy production will compete with fibre needs, since rates of return are much higher than energy potential, or food, for that matter. A tonne of wood pulp sells for almost three times the price of a tonne of wheat.

3.3/ Agriculture

Ontario has the most diversified agricultural sector of the Canadian provinces, with total receipts in 1980 reaching $4.3 billion, of which 64% was represented by livestock sales and almost all of the remainder by crops. At the same time, $2.3 billion was imported, and $1.3 billion exported. Imports were dominated by fruit, vegetables, oil-seed products, sugar and plantation crops. Exports were dominated by meats, grains and beverages.

The agricultural sector is capital-intensive, like the other areas examined in the report, but it has a comparative disadvantage because most farm units are still small and unable to generate large capital investment requirements. The average asset value of a farm in Canada is $183 000. Generally, equity is in the 80% range. Faced with major costs for new machinery which are multiples of average asset value, many farmers are unable to expand to generate an optimum return.

There has been no move to large corporate holdings as has happened in the United States. Ontario farmers remain locked into the unstable price regimes of agricultural commodity markets. This instability is due to several factors.

- Natural hazards give rise to uncontrollable variation in supply.

- Production commitments are most often made by farmers who respond to current market prices. If prices are up, they expand, and if prices are low, they cut back. This behaviour results in predictable cycles.

- Production periods are long because of breeding cycles and seasonal periodicity.

- Costs of storage, i.e., withholding goods from market, are high.

These same factors will plague Ontario agriculture until farm units are large enough and/or flexible enough so as to not exacerbate cyclical behaviour. The conditions of the future may change somewhat, dependent upon the relationship between cost and price.

Global 2000 forecasts real food prices to increase by 21% to 63% by the year 2000 [1]. These rises are assumed because rising populations and per capita incomes will create demand, while world supply will be constrained by a physical shortage of new arable land, and a serious loss of soil quality and other requirements.

At the same time, they suggest that demand will grow by 2.2% per annum until the year 2000, and that this demand will be satisified by intensified use of petroleum-based inputs such as chemical fertilizers. Since 1973, the proportion of farm operating costs in Canada represented by petroleum-based inputs has increased from 19% to 25%. Some of this cost increase is due to fertilizers, pesticides and transportation. As with the other resource sectors, agriculture will remain competitive so long as it keeps its costs down.

The essential nutrients in fertilizers are phosphorus (P), nitrogen (N), potassium (K) and, sometimes, sulphur (S). With the exception of sulphur, none of these nutrients is sourced in Ontario. All phosphate is imported

as rock and processed together with natural gas ammonia to produce ammonium phosphate. Phosphate rock is sourced in Florida and, to a limited extent, in Morocco, which has the world's largest reserves. The Moroccan reserves are constantly threatened by political current, and all imported rock will become more expensive as transportation costs increase. These events will lead to the development of domestic phosphate deposits in northern Ontario. The phosphate development will also then absorb a large portion of the sulphuric acid produced as a by-product from acid rain control at Sudbury.

Biocide costs will continue upward, in part, because of their petroleum costs, but, to a large extent, because of increased environmental testing requirements, the cost of which must ultimately be carried by the food producer/consumer. These costs will be very high.

About 40% of fresh vegetables imported into Ontario is represented by lettuce and tomatoes. These are supplied, to a large extent, by farms in California and Texas, both of which are experiencing the result of soil erosion, loss of nutrients and soil compaction, salinization of land and irrigation water, water shortages, loss of high-quality land to urbanization and increased costs. Together with increased cost of transportation and the projected deterioration of the U.S. rail system, these factors all point to substantially higher prices for vegetables which can be raised under greenhouse conditions in Ontario.

As the cost of imports increases, Ontario may also belatedly take advantage of its moderate climate and rich soil in the southern peninsula to grow those items for which conditions are amenable to increased production. Ontario imports almost four times as many apples as it exports. To some considerable extent, this is due to a severely inadequate breeding programme and the introduction of the Granny Smith apple, which has no domestic Canadian competition. Twenty-five percent of all fresh fruit import is represented by grapes. Increased emphasis on, and resources for, genetic improvement programmes would give results by the year 2000.

Canada Agriculture projects a per capita increase in beef consumption of 67% by 2000, even under high-price assumptions. At the present time, the province exports more meat than it imports. Unless there is considerable

supply improvement in Ontario, imports are certain to increase. Substantial amounts of meat now come from the South Pacific as lamb and range beef. In part, this is due to Ontario's seasoned production of lamb and the lack of a year-round breeding programme. It is also due to the import of low-fat, inexpensive range beef for fast-food hamburger outlets.

Increasing meat production in Ontario will be dependent upon the price ratio between grains and meat. Traditionally, there is competition in land use between grazing and forage and the growing of grains. Since all of Ontario's agricultural land is amenable to grain production, there is little likelihood of large-scale grazing developments, unless the northern clay belt is developed. Meat prices would have to rise substantially to support brush clearing for rangeland development. The same high costs will constrain feed-lot expansions, although a number of superior processed feeds which are now available could make some types of hog-lot and beef-lot operations more economically attractive.

Agriculture Canada has calculated that if dairy and poultry production expands to fill only domestic demand, it would need to increase by 50% under low-price assumptions and 30% under high-price assumptions. They suggest that export markets for poultry would open up and expand as well. It is assumed that these new markets would be in the oil-rich countries of Mexico, Venezuela, Nigeria and Saudi Arabia. At present, poultry represents little more than 2% of total agricultural exports. If this market is to be expanded, considerable market development must be done by government and the industry.

Ontario has internationally-renowned breeding herds of dairy cattle, which are exported to many developing countries. As the oil-rich nations expand, particularly in the Middle East, where dairy products have a modicum of acceptability, market potential could exist for expanding breeding stock and genetic material bases in Ontario.

3.4/ Fisheries

In recent times, the contribution made by the commercial fishery to value added in Ontario has been about 0.1% to 0.2% of that of the commodity-producing industries. As such, it is of little importance as a major

economic factor. However, the fish harvest does influence the livelihood of commercial fishermen, particularly on Lake Erie, and the sports and recreation industry throughout the province.

The Lake Erie commercial fishery accounts for some 75% of commercial fishing value in Ontario. That fishery has been through a lengthy series of changes, largely because of commercial extinction of species due to overfishing and ecological change. The blue pickerel, which formed the bulk of the catch during the '30s and '40s, is now extinct, and sauger are not of any commercial importance. Lake trout were decimated by lamprey introduction. Yellow pickerel replaced these species during the '50s, but their populations crashed, and they are no longer commercially significant. The most important commercial species are now yellow perch and smelt -- the expected result in an overfished lake. Yellow perch populations also show signs of stress and deterioration. It is not anticipated that Lake Erie will ever recover to its former importance as a source of fish, let alone expand in significance by the year 2000.

The other major lakes, such as Lake of the Woods and Nipissing, are also seeing stress in the yellow pickerel populations, due to overfishing. Nipissing is primarily a sport fishing lake, with yellow pickerel and yellow perch providing most of the catch.

The sports fishery in the small Shield lakes is threatened by acid precipitation, eutrophication from increased concentration of recreation activity, and overfishing. The year 2000 will see the fishery resource available only at a considerable premium above its current status as a "loss leader" to induce tourism.

4/ FUTURE SCENARIOS

Ontario's resource base is substantially food, fibre and structural materials, for the purposes of this report. It is the author's thesis that the Western economy is in a maturation phase, perhaps prematurely precipitated by the OPEC crisis, but one where the structural asymptote would have occurred soon anyway. Growth in the past was fuelled by the rebuilding of Europe, the technical revolution in the United States, the rebuilding of Japan, and the integration of these economies. The Third World will not replace these areas with the same rate of growth and will, therefore, not fuel a recovery which will resemble growth in the '50s and '60s. These countries do not have a social and technical history and infrastructure on which to base rapid industrial diversification. It will take a long time for sufficient social and economic evolution to support a sophisticated level of industrial diversity.

There will be three processes at work which will have some impact, but their predictability will vary:

1/ slow capital growth in the Third World;

2/ segmented growth in the industrial world, perhaps best illustrated by today's economic behaviour in Japan, where heavy industry is in decline and high-tech is taking off; and

3/ slow capital goods replacement in the industrial world.

New plants and equipment require substantial inputs of metal. Metal demand has been sluggish over the last decade because new plant construction ground to a halt. Real metal prices have been in decline, and the proportion of GNP growth occupied by metals has been in rapid decline. At the same time, there has been a negative effect induced by escalating energy costs, lower ore grades and increased recycling. A new competition pattern is likely to emerge over the period between now and the year 2000, which will dampen the oscillation in what has been a traditionally cyclical industry. Production costs will be critical to survival of the firm, and efficiency will become a preoccupation of managers. Full attention will be given to reducing labour, energy and transportation

costs, which form the large part of production cost. It will become more and more difficult for state-subsidized industries where costs are very high, because cost/price margins will be very thin. Political stability, or lack thereof, will be increasingly important.

The pulp and paper industry went through two shocks in the '70s: environmental control and increased energy cost. These factors, together with the generally archaic nature of its plants and a boost from government, induced the industry to modernize. It is highly unlikely that any changes will take place, before the year 2000, in technology at the mill level. As with the metals industry, there will be increased attention given to labour and energy. The largest single factor facing the industry in 2000 will be cost of wood. The production costs presented in Section 3 clearly show that any dramatic increase in the cost of wood supply would rapidly diminish the competitiveness of Ontario suppliers. It must be assumed that there will be an overall decline in long-fibre soft-wood relative to demand over the longer term, which may allow prices to escalate sufficiently to absorb increased wood costs.

4.1/ Low-Growth Scenario

If it is assumed that the Ontario resource sector will experience low growth in a low-growth Western economy, it is likely that the following will occur.

- Nickel producers will prosper due to failure of competitors who are using high-cost laterite ores. No new producers will enter the field in Ontario, and existing producers will maintain capacity.

- Copper producers will maintain their position as other high-cost operations in the world fail. New technologies, such as pressure leaching, will not be used in Ontario due to ore complexity and size of deposits.

- Pulp and paper producers will experience wood shortages. Some producers who are short of wood may close, but those with adequate supply will prosper.

- New technology, such as fibre optics and video communication, will not have a large effect. Newspapers will maintain their consumption of newsprint, and fibre optics will only constitute some replacement of existing and new telecommunications equipment.

- Soft vegetable and fruit imports will become more expensive as traditional sources in the United States undergo stress from salinization, increased labour cost and social upheaval. Increased transportation costs will increase competitiveness of domestic production. Some substitution will occur, and conflicts among Class I farmland users will increase.

- Oil-seed production will increase somewhat.

- Conversion of plant material to animal protein will become more expensive.

- Domestic phosphate deposits will be in production because of acid rain controls and increased fertilizer demand.

- Increased food prices will make biomass fuels unattractive as competitors for farmland use.

4.2/ High-Growth Scenario

If rapid growth is assumed, it is likely that the following will occur.

- Metal producers will generate enormous profits due to low costs and high metal prices. Exploration will increase and new discoveries will be made. Lower-grade deposits will be economic. Opportunities for domestic fabrication may increase. New technology will not have a dramatic effect, with the exception of deep-sea mining. Ontario minerals will still enjoy a substantial cost advantage over deep-sea sources.

- Rapid growth of alternatives, such as fibre optics, will be accompanied by rapid growth of traditional users and the development of alternative

applications for metals. Because Ontario has low-cost production, its producers will be able to maintain themselves in any market over the long term.

- If there is rapid growth in the Third World, some of it will be in the metals area. New copper projects will start operation in Peru, Brazil and Mexico. Cuban nickel deposits will be developed. Existing Third World producers will expand.

- There may be new attempts to establish metal cartels similar to CIPEC (copper cartel). It is doubtful whether they will be successful because of the numbers and variety of metal producers.

- The United States will have been increasingly sensitive to failure in its own metals industry, and will have adopted protective measures.

- Reforestation will remain an issue. The question of government/-industry cost sharing will have been resolved to some extent.

- The conflict over resource use by native people will not have been solved to anyone's satisfaction. The forest resource will remain particularly contentious, especially given the shortage of available trees.

- Fibre substitution will be a major research and industrial activity as replacement for scarce lumber occurs.

- Ontario agriculture will increasingly resemble the European system as the province attempts to retain diversity and Class I farmland. It is difficult to say whether the same types of trading difficulties will emerge, but it is likely that Quebec agriculture will increasingly focus on items which will compete in Ontario markets.

5/ ENVIRONMENTAL INTERFACE

The resource extraction area was the preoccupation of environmental agencies over the last decade because it was the most obviously dirty sector. The pulp and paper industry spewed millions of litres of untreated waste into rivers. Run-off from mine tailings ruined rivers and landscapes. Smelter gases denuded the Sudbury Basin and sterilized lakes. Slowly, but surely, this is changing.

Policy analysts during the early '70s saw a day in the future when pollution control measures would be as much a part of day-to-day activity as brushing your teeth. It was with this view that they considered long-term "programme redundancy" for pollution control regulation development. They assumed that industrial engineers would design plants which would more or less be emission- and effluent-free, and that this approach would be an accepted, unquestioned part of daily industrial practice. Just as there are now no eight-year-old children working in mines or sweat shops, in due course there would also be no more INCO sulphur emission or Reed Paper mercury effluents. To some extent, this now occurs. The new Texasgulf smelter has over 96% sulphur containment. The new Stelco plant at Nanticoke is very clean. The modernization of the pulp and paper industry will achieve significant advances. The new INCO smelter to be built this decade in Sudbury will have very few environmental or industrial hygiene problems.

Increasingly, economics will also add another dimension to the problem. Many of the commonly-defined pollutants are useful products in the wrong place at the wrong time. Sulphur dioxide control is, in large part, a question of management of the sulphur resource. The sulphur is used in the first instance by the smelting company and released into the atmosphere as sulphur dioxide (SO_2). The next oxidation state of the sulphur, i.e., as sulphuric acid, is not being used. Not only is acid rain an environmental irritant, it is a waste of the sulphur resource. (A tonne of sulphur is equivalent to two barrels of oil.) As sour-gas sulphur supplies run down and foreign sources such as Poland become riskier, the utilization of smelter-gas sulphur becomes economically more and more attractive. Similarly, the gold smelter at Red Lake now collects its arsenic emissions for sale as arsenic trioxide powder in the United

States. The Great Lakes Pulp and Paper Company now recycles and uses most of the waste generated by the pulp mill in Thunder Bay.

Moving into the second millenium, the "environmental question," insofar as the resource sector is concerned, will shift from a waste-control problem to a problem of management of the resource itself. Pulp mill waste, slash and sawdust will have given way to debate over who owns the trees, who harvests them, who replants them, and who pays and who benefits. Resource husbandry will become a major focus again. Native people will have claimed and been given rights to a large part of Ontario forests. The management of the forest resource could then take on the same complexion as the wildlife management question in the Arctic.

Forestry and agriculture areas will need to continue to deal with the toxic substances issue. Biocides will become more important with a move to monoculture forest husbandry. Agriculture will need to maintain intensive production based on chemicals of several types. Soil fertility, composition and structure will remain problems, particularly if there is a move into the clay belt.

6/ FEDERAL/PROVINCIAL RELATIONS

Canada has seen an intensification of federal/provincial conflict in the last decade, largely over petroleum resources and revenue sharing. This has obscured a fundamental schism which must be resolved before the century is out.

In spite of popular opinion to the contrary, since the Pearson years of co-operative federalism, there has been a steadily increasing erosion of the power of the central government. This debilitation has brought the country close to a point where the federal government cannot effectively control the economy and, therefore, cannot govern. One very small example is the influence of provincial government and Crown corporation borrowings abroad. The interest payments on these foreign loans alone has a significant effect on the dollar.

Whether admitted or not, Canada is, and will remain for the foreseeable future, a resource-based economy. Export industries trade into world markets for copper, nickel, wood, and pulp and paper. Any effective management of Canada's international economic affairs must be conducted from a coherent national economic outlook.

Resource management is dependent on improvements in federal/provincial relations, including jurisdictional issues. For example, the fishery, by constitutional definition, is a responsibility of Parliament. Pursuant to this jurisdictional capability, Parliament legislated the Fisheries Act which provides authority to manage and regulate the fishery. By Order-in-Council, the Act is administered by the provinces where inland fishing is concerned. The federal minister refuses to accept responsibility for provincial actions under it. The forests are, by constitutional definition, the property of the provinces. The federal government maintains substantial research capability in forestry, and acts in an advisory capacity. Both levels of government are now facing the issues and potential costs of reforestation.

Native people are a responsibility of Parliament. They are sequestered on little islands of federal jurisdiction which often lack a natural resource base and are surrounded by forest and mineral resources vested in the provincial Crown. The largest product of the reserves is a flood of people to the cities, fleeing from a life which is largely based on federal financial largesse. This is a difficult situation for everyone involved. There is a need for resolution of the issues over resource use as a result of native claims for resources and provincial assertion of ownership. There is also a need for federal solutions other than the ability to distribute funds.

7/ CONCLUSIONS

This report introduced a view of a rapidly changing world and the difficulty of projecting into the future. In 1974, the counter-culture, OPEC, women's liberation in its present form, electronic calculators, word processors and Japan had not been seen. However, Ontario was the world's largest source of nickel, a significant source of copper, a major supplier of pulp and paper, and possessed of a diverse agricultural base. All of these remain true.

It seems a paradox to contemplate those industries as beset by problems, when the future appears to be expanding and natural resources are, if not in acknowledged short supply, at least projected at a premium. The major reason for this insecurity is that the world is not as it was and comfortable relationships appear about to change.

The United States has not yet come to terms with its changed economic and political position. America still sees itself through rose-coloured retrospectives. It has not come to terms with Europe as a major economic and military power. It has not learned to compete with Japan.

As the United States' major supplier and customer, Canada is, of course, immediately exposed. It is uneasy, and so are the other major exporters to the United States -- Japan at the foremost. The United States is now increasingly an importer of finished and semi-finished goods. It is the world's largest market for finished goods, but because of declining productivity, it is losing its ability to be the largest market.

Unless the Western economy collapses, there will remain an export market for Canadian and Ontario production of metals, fibres and food. It will almost certainly not be the same comfortable, close-to-home, shipping of material south of the 49th parallel. So long as production costs remain competitive and prices reflective of cost, there will be a market. The challenge will be to meet that market as it evolves.

Canadian suppliers have been criticized by customers for moving to the world market when times are tough, and for running back to their traditional customers in the U.S. as soon as there is an improvement. They are considered unreliable suppliers as a result. If Canada is to remain a significant participant in the world market, it will need to become a sophisticated participant.

The market for pulp, paper and metals will remain an export market, whether the form of export is raw material or semi-finished products.

At present, there are concerns over protectionism, economic isolation and self- sufficiency, to a large extent caused by the recent recession. The year 2000 will see a relaxation of these views, at least such that materials, fibres and food can continue to flow.

8/ REFERENCES

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